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ABSTRACT

Education in predictive, preventive and personalised medicine

EDUCATION IN PREDICTIVE, PREVENTIVE AND PERSONALISED MEDICINE: EPMA STATEMENT

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Innovative Initiatives in Education of Professionals

The members of the Editorial BOARD of *The EPMA J.* working weekly with the manuscripts and the peer-review procedure of the journal know very well, how difficult this task is. Different professional groups in personalised medicine have realised that they speak "different professional languages" less understandable for others. Consequently, great discoveries made / innovations triggered by one professional group, are frequently underestimated or even not valued at all by the others resulting in delays to the implementation of novel developments in personalised medicine across diverse areas. Therefore, in healthcare we need to develop a new culture among experts in order to promote the multidisciplinary field of personalised medicine. Our message is - the innovative PPPM-related educational programmes for professionals should be prioritised in the *Common Strategic Framework* (FP-8) as well as in other global and corresponding national programmes.

In order to promote innovative educational programmes, in collaboration with Springer, EPMA has developed worldwide pioneer initiatives creating the didactic materials for the field as follows:

A. *The EPMA Journal* that regularly updates both needs and achievements in the field of PPPM in application to major and rare pathologies.

B. The book-series **"***Advances in Predictive, Preventive & Personalised Medicine"* (Book-series Editor: Olga Golubnitschaja); the book-series release is starting in 2012 with the following volumes:

- "Healthcare Overview: innovative national and international programmes dedicated to predictive, preventive & personalised medicine", Volume Editor: Vincenzo Costigliola, Brussels, Belgium (Fig.1);
- "PPPM in Diabetes mellitus", Volume Editor: Mahmood Mozaffari, Augusta, USA;
- "PPPM in Neurodegenerative diseases", Volume Editor: Silvia Mandel, Haifa, Israel;
- "Drug delivery systems: Advanced technologies potentially applicable in personalised medicine", Volume Editor: Jorge Coelho, Coimbra, Portugal.

This important initiative should be obligatory supported and well used at the European level and worldwide.

Fig. 1 Book-series "Advances in Predictive, Preventive and Personalised Medicine" in preparation by EPMA / Springer to be released in the years 2012–2015 as the didactic material for specialised educational programmes

Educational Measures for Population: Promoting Participative Medicine

Advanced personalisation in medicine is achievable solely in the case of participative medicine that meets the demands of patient advocacy groups focussed on individually created medical approaches. The reader will find a number of positive examples in each issue of *The EPMA J.* and single volumes of the book-series "*Advances in PPPM*" concordant with this statement. It is evident that strong restrictions in the amount of education lead to dramatic deficits and costs that have repercussions in several branches of the society resulting in increased pressure within healthcare systems [1]. Our message is - new guidelines are essential to regulate the field in favour of educational measures for preventive programmes and advanced healthcare systems.

References:

1. Golubnitschaja O, Costigliola V. Common origin but individual outcomes: time for new guidelines in personalized healthcare. Per Med. 2010;7:561–8.

PUBLISHING IN PREDICTIVE, PREVENTIVE AND PERSONALISED MEDICINE: SPRINGER STATEMENT

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Our business is publishing. Throughout the world, we provide scientific and professional communities with superior specialist information – produced by authors and colleagues across cultures in a nurtured collegial atmosphere of which we are justifiably proud.

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Predictive, preventive and personalised medicine (PPPM) offers great promise for the future practice of medicine.

Essential components of this approach include well-organised population screening protocols utilising novel diagnostic biomarkers of disease states; targeted prevention of common human pathologies; optimal treatment planning and personalised medicine, resulting in substantial improvement of the quality of life. This approach also offers the advantage of delivering care at potentially reduced costs to the population at large, addressing social and ethical issues related to healthcare access and affordability.

Springer proudly publishes *The EPMA Journal* on behalf of the EPMA. The journal addresses these highly relevant issues in editorial overviews, review articles and annotated papers. Despite the rapid expansion in the areas of predictive, preventive and personalised medicine, there is, to date, no review journal dedicated to this field of science that provides concise summaries on important topics. Springer believes that *The EPMA Journal* is a valuable addition to the scientific literature and are confident that it will make a global contribution. This is currently reflected in the rapidly increasing online usage of the journal.

Springer now also publishes the forthcoming Book Series "Advances in Predictive, Preventive and Personalised Medicine" which serves as an extension of the journal. This Series will serve as a basis for the education of medical students, healthcare-providers and related disciplines at the various universities and medical centers.

PPPM-RELATED EDUCATIONAL MEASURES AS A PART OF EFFECTIVE PREVENTION – A CASE STUDY

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Oxidation of low-density lipoproteins (LDL) promotes atherosclerosis by enhancing vascular inflammation and foam cell formation. The corollary is that diets that stimulate endogenous anti-oxidants may protect against atherosclerosis. Our group has recently studied the influence of sulforaphane, an isothiocyanate derived from green vegetables, on vascular physiology. We observed that sulforaphane can suppress inflammatory activation of vascular cells by inducing an antioxidant transcription factor called Nrf2. A deeper understanding of vascular responses to sulforaphane may inform nutritional approaches to prevent vascular inflammation and atherosclerosis.

SPECIALISED EDUCATION FOR PERSONALIZED MEDICINE – WHY ?

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Personalized medicine represents a new approach to the disease prevention, primary diagnosis and individualized therapy approaches. Traditional medical model existing for centuries has been limited to the individual anamnesis data, clinical signs, results from laboratory analyses and from imaging methods and social circumstances, environment and behavior. Diagnosis and therapy has been applied empirically based on multicenter epidemiological studies of large cohorts supported by an extensive development of laboratory and imaging techniques. Nevertheless, these approaches have not taken into account the genetic variability (single molecular profiles) of individuals within a population.

Personalized medicine seeks to provide an objective basis for consideration of such individual differences using the advances in a number of molecular profiling technologies, including proteomic profiling, metabolic analysis, and genetic testing (http://en.wikipedia.org/wiki/Molecular_biology). Information about a patient's protein, genetic and metabolic profile could be used to tailor medical care to that individual's needs. The main challenge of personalized medicine is to predict a disease, monitor its progression and create stratified individualized therapies. The ultimate goal of personalized medicine is disease detection in asymptomatic stage and prevention of clinical manifestation of the disease.

Educational process should meet the needs and cover all the levels across the society. Personalized medicine will be very demanding on personal understanding, healthcare organization and economy. Educational process should focus on both non-professional (general) population and professionals in personalized medicine. This process should start with the field-related education already at elementary schools as it has been already implemented in some countries. General population should be provided with sufficient information. Professional educational process should involve not only universities, but also diagnostic and pharmaceutical companies, healthcare providers / insurance companies, communication media and related non-profit organizations. Educational process should be network at the national and international levels.

It should result in national and European guidelines for personalized medicine. This contribution highlights the existing and proposed programs for specialized education in personalized medicine in the Czech Republic.
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SPECIALISED EDUCATION IN BIOMARKERS FOR PERSONALISED MEDICINE: EXPERIENCE IN CZECH REPUBLIC

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In personalised medicine, monitoring of genome and biomarkers, including their correlation with clinical data, is essential. Considering the fast growing knowledge about biomarkers and their function as well as a rapid development of analytical techniques, specialised professional education of clinicians and researchers in the field is essential.
In the Czech Republic we accumulate this experience by organising educational courses for experts involved in biomedical research, focused on biomarkers, their analytical determination and application in different areas and concepts of medicine. The educational courses are created as follows:

- General overview of immunoanalytical techniques
- Application of novel biomarkers in oncology
- Application of novel biomarkers in gynaecology
- The role of biomarkers in personalised medicine.

The aim is to attract attention of clinicians to the multifunctional role of biomarkers and the importance of their accurate determination, and to network the expertise of laboratories with clinical practice. The lecturers are invited from different areas related to the topic and intended to provide the participants with the full overview in the issue. Professional discussions among experts are encouraged.
Each of courses is attended by more than 20 persons from laboratories, universities and hospitals of different regions in the Czech Republic. The participants receive also a practical overview by visiting the Laboratory of immunoanalysis at the University Hospital in Plzen - one of the biggest immunoanalytical laboratory in the Czech Republic.

CAN PAIN MANAGEMENT PROTOCOLS BE EVIDENCE BASED, PHYSIOLOGICAL, SAFE AND PERSONALIZED? NEW CHALLENGES FOR EDUCATION IN PPPM

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This contribution deals with clarification and standardization of techniques for injection and stimulation pain relief, such as dry needling, acupuncture, physical therapy under ultrasound guidance. According to own experience, ultrasound (US) is the most acceptable technique for image guidance and monitoring pain treatment. Ultrasonography and electromyography (EMG) under US guidance provides accurate diagnostic information and could become a predictive “gold standard” of neuromuscular disorders with performance of effective intelligent decision guided treatment. The integrated use of three-dimensional modeling based on the data collected from different sources of visual information improves the quality of diagnostics and pain syndrome treatments and allows for performing the model-guided interventions.
Field-related educational programs are essential to integrate the multi-fuctional expertise for the pain study and management techniques, advanced diagnostic methods, EMG, imaging technologies, adequate medical record considering genetic, anatomical, histological, physiological and other individual parameters of individual patient profiling. We propose a designing of the complex phantom-virtual training systems as the major component of specialized educational programs in pain medicine. It should be a link between theoretical training and acceptability of specialist to work with the patient and also an effective tool for pre-treatment planning in specific clinical situations and for new interventional approaches to provide a high level of patient safety.